CLAIMS

What is claimed is:

1. A method for replicating a monolayer comprising the steps of:
providing a first set of monomers;
forming the first set of monomers into a monolayer having a desired pattern;
optionally polymerizing the first set of monomers, forming a first optionally polymerized monolayer having a desired pattern;
attaching a second set of monomers to the first patterned, optionally polymerized monolayer, forming a second monolayer attached to the first patterned, optionally polymerized monolayer;
polymerizing the second monolayer, forming a second polymeric monolayer attached to the first patterned, optionally polymerized monolayer; and
dissociating the second polymeric monolayer from the first patterned, optionally polymerized monolayer.

2. A method for replicating a monolayer comprising the steps of:
providing a plurality of monomers;
providing a template for a monolayer to be replicated;
binding the plurality of monomers to the template, forming a monolayer replicant;
polymerizing the monolayer replicant; and
disassociating the polymerized monolayer replicant from the template.

3. The method of claim 2, wherein the template is a patterned substrate.

4. The method of claim 2, wherein the template is a patterned monolayer in solution.

5. The method of claim 2, further including the step of using the polymerized monolayer replicant as a template for creation of at least one additional polymerized monolayer replicant.

6. The method of claim 2, wherein said monomers are nanoparticle ensembles.

7. The method of claim 6, wherein said monomers are selected from the group consisting of Hentriaconta-11,13,20,22-tetraynoic acid, Hentriaconta-11,13,20,22-tetraynoic acid amide, Triaconta-10,12,19,21-tetraynoic acid amide, Triaconta-10,12,19,21-tetraynoic acid, and other molecules of that family.

8. The method of claim 2, further including the step of selective mineralization of the replicant.

9. The method of claim 2, further including the step of electroless plating of the replicant.

10. The method of claim 2, further including the steps of nanoparticle adhesion and sintering of the replicant.

11. The method of claim 2, further including the step of growing a semiconductor upon the replicant.

12. A method for assembling a multilayer film comprising the steps of:

providing a layer template;

providing a plurality of monomers;

binding the plurality of monomers to the template to form a layer;

polymerizing the formed layer;

using the polymerized layer as a template for a subsequent layer; and

repeating the steps of binding, polymerizing, and using until a multilayer film of desired thickness is obtained.

13. A method for replicating a monolayer comprising the steps of:

providing a first set of monomers having a first recognition chemistry;

providing a second set of monomers having a second recognition chemistry, the second recognition chemistry being complementary to the first recognition chemistry;

forming a first type of template from a subset of the first set of monomers;

binding a subset of the second set of monomers to the first type of template to form a replicant of a first replicant type;

polymerizing the replicant of a first replicant type;

disassociating the polymerized replicant of a first replicant type from the first type of template; and

utilizing the polymerized replicant of a first replicant type as a second template type for replicants of a second replicant type.

14. A method for replicating a two-dimensional patterned structure comprising the steps of:

providing a plurality of monomer units having crosslinker arms;

providing a template of the two-dimensional patterned structure;

binding the monomer units to the template;

reacting the crosslinker arms to bind the monomer units to each other to form a two-dimensional replicant; and

disassociating the two-dimensional replicant from the template.

15. A method for forming a patterned layer of metal on a surface comprising the steps of:

providing a surface having thereon a patterned layer of a photoresist material, portions of the surface not being covered by the photoresist material;

attaching metallic nanoparticles to the portions of the surface not covered by the patterned layer of the photoresist material; and

melting the metallic nanoparticles, thereby forming a layer of the metal having a pattern complementary to the patterned layer.

16. A method for replicating a multi-component pattern comprising the steps of:

providing a plurality of sets of monomers having recognition chemistries;

providing a template having a plurality of regions, each region being complementary to a different set of monomers;

binding a set of monomers to each region to form a multi-component replicant;

polymerizing the multi-component replicant; and

disassociating the multi-component replicant from the template.

17. The method of claim 16, further including the step of binding a plurality of inorganic materials to the multi-component replicant.

18. The method of claim 17, wherein at least one of the inorganic materials is metallic.

19. The method of claim 16, further including the step of selective mineralization of the multi-component replicant.

20. The method of claim 16, further including the step of electroless plating of the multi-component replicant.

21. The method of claim 16, further including the step of growing a semiconductor upon the multi-component replicant.

22. A family of molecules exemplified by Hentriaconta-11,13,20,22-tetraynoic acid, Hentriaconta-11,13,20,22-tetraynoic acid amide, Triaconta-10,12,19,21-tetraynoic acid amide, and Triaconta-10,12,19,21-tetraynoic acid, the molecules having two diacetylene units linked by a methylene chain of from 1 to 20 carbons to form a bis(diacetylene) unit, an alkyl chain of from 1 to 20 carbons terminating in an inert functionality such as a methyl on one end of the bis(diacetylene) unit, and an alkyl chain of from 1 to 20 carbons terminating in an amide or carboxylic acid at the other end of the bis(diacetylene) unit.